32. Silver Sagebrush Ecological Series

Table 32-1. Full and short names for the ecological types in the Silver Sagebrush Ecological Series.			
Ecological Type		**Plant Association**	
Code	**Name**	**Code**	**Short Name**
SU7	Silver sagebrush/Thurber fescue-Idaho fescue–Cryoborolls–Benches, mesas, and parks, 8,900-10,400 ft	ARCA13/FETH-FEID	Silver sagebrush/fescue–Cold dark soils

This is the *Artemisia cana* (silver sagebrush) Series of Hess (1981) and Bunting and others (1987), and includes the *Festuca thurberi* Series, in part, of Komárková (1986). It has been broken out of the *Artemisia* (Sagebrush) Series of Donart and others (1978) and Tweit and Houston (1980), which is much too large.

Stands form a distinctive pattern on aerial photographs, appearing as depleted, midseral riparian parks. Stands occupy moderate to large-sized sites which are often isodiametric in shape.

Vegetation, Climate, Soils

Silver sagebrush has strong invasive capabilities (Turner 1969), so many of the sites where it occurs are not at potential (Komárková 1986). Many of the sites where silver sagebrush is dominant are earlier seral stages of some higher-elevation riparian willow shrublands (Youngblood and others 1989). This Series is intended to exclude such sites; the following plant association represents those few sites where silver sagebrush is successionally stable.

These sites have a moderately-high water table.

Table 32-2. Climate and Soils		
Characteristic	**Value**	**Reference**
Precipitation	400 to 510 mm/yr 16-20 in/yr	Local data

Range and Wildlife Management

Forage production can be high to very high on sites in good condition. Management should work to protect reproduction of Idaho, Arizona, and Thurber fescues.

Many stands of mountain big sagebrush in the Great Basin were sprayed with 2,4-D in the 25 years following World War II, and a few silver sagebrush stands were included in those treatments. Chemical spraying with 2,4-D increases grass cover and litter and decreases bare ground five years after spraying (Sturges 1986). The sagebrush density slowly recovers but remains less than the pre-fire density even 20 years after treatment (Sturges 1993).

Prescribed burning is recommended for sagebrush control, but burned areas must be in large enough aggregates and must be protected from wildlife and livestock for long enough after fire (at least two growing seasons; Wright and others 1979), to assure recovery of vegetation. Otherwise, the bare ground produced by overgrazing will induce invasion of undesirables such as rabbitbrush.

These sites provide habitat for a variety of ground-nesting and ground-feeding birds. The areas between the sagebrush shrubs are favored by elk and especially by deer for bedding, since there is often abundant forage and much hiding cover below 1 m.

Fire Management

Presettlement stand-replacing fire frequency ranged from 40 to 60 years, with smaller, less intense fires every 20 to 25 years (Wright and others 1979). Repeated burning every few years, or burning in summer, depletes stands of perennial grasses and allows weeds and invasive forbs to increase (Wright and others 1979).

Fires should be planned for early spring or after late summer (Wright and others 1979).

After a fire, perennial forbs dominate the vegetation for 2-3 years, after which grasses dominate until the sagebrush re-establishes. Spring fires do not eliminate any species, but increase productivity of some species (Bunting and others 1987). Rabbitbrush may resprout following a fire.

Insects and diseases in this series are not documented.

Recreation, Roads & Trails, Scenery

Sites of this series are poorly suited for roads and trails, since the soils are deep and loamy, and sites are often prone to slumping. Roads and trails should be graveled, cut banks riprapped, and ditches and culverts installed. Road and trail use leads to significant soil compaction.

Sites of this series are also not suitable for developed recreation, since disturbance increases the downward mobility of slumps. However, sites are moderately suitable for dispersed recreational activities.

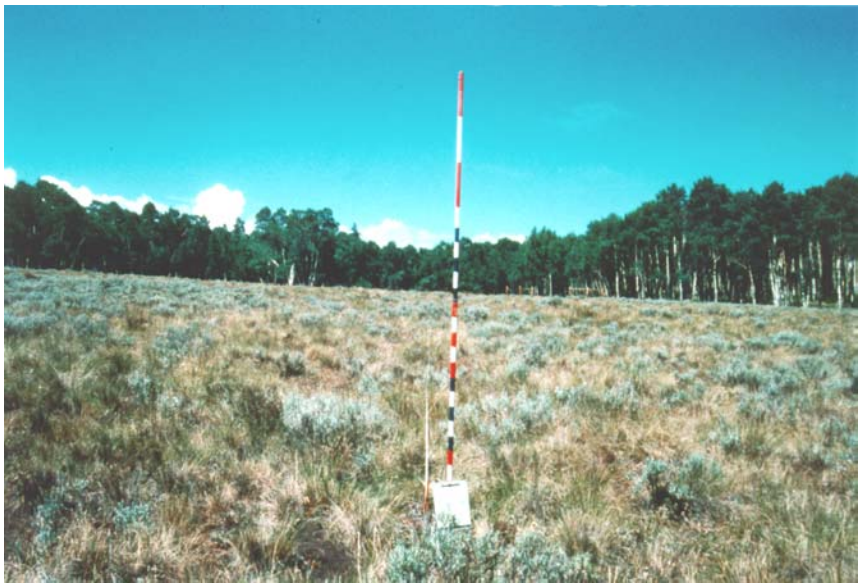
Revegetation and Rehabilitation

These soils are deep and highly productive of a large variety of grasses, forbs, and shrubs, so plant cover should be easy to establish. However, sites are often prone to slumping, so management should work to establish good, soil-binding vegetation cover as quickly as possible after disturbance. Grazing, road and trail use leads to significant soil compaction.

Invasion by Kentucky bluegrass (*Poa pratensis*) is common after disturbance. Restoration of vegetation can be difficult after depletion of the community by grazing (Hironaka and others 1983) probably because of poor seed production and germination success of fescues in depleted stands.

Table 32-3. Characteristics of Ecological Types within Ecological Series 32 in the Upper Gunnison Basin.
Numbers are shown in form *Average (Minimum-Maximum)*

Code Short Name	No. Samples	Elevation, ft	Avg. Aspect, °M (r) Slope, %	Soil Coarse, %	Depth, cm Mollic, cm	Surface: Coarse, % Bare, %	Cover, %: Trees Shrubs Graminoids Forbs	Total Live Cover, % No. Species TLC/NS, %
SU7 Silver sagebrush/ fescue–Cold dark soils	10	9,822 (8,900-10,390)	4 (0.42) 8 (4-15)	19 (11-42)	96 (44-154) 25 (20-30)	2 (1-5) 15 (1-34)	0 (0-0) 31 (17-45) 102 (62-148) 65 (21-195)	198.4 (128.1-355.0) 27 (14-40) 8.4 (4.3-25.4)



An example of silver sagebrush/Thurber fescue-Idaho fescue (Community Type B). Thurber fescue 56%, silver sagebrush 17%, Rusby clover 6%. Coarse Fragments Cover = 2%, Total Live Cover = 157%, Coarse Fragments in Soil = 12. Soil sampled as an Abruptic Cryoboroll, Fine-Loamy, Mixed. Rudolph Hill Quadrangle, elevation 10,390 ft, 7% 065° slope. August 11, 1994.

Silver sagebrush/Thurber fescue-Idaho fescue–Cryoborolls–
Benches, mesas, and parks, 8,900-10,400 ft

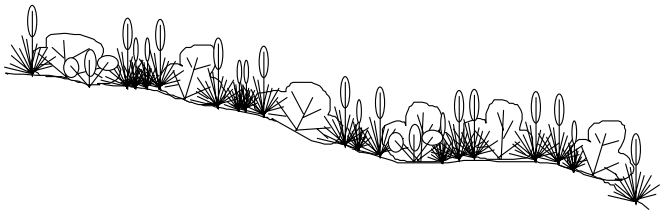


Figure 32-1. Cross-section of vegetation structure of *Silver sagebrush/fescue–Cold dark soils*. Aspects are northerly, and slope angles average 8%.

Silver sagebrush/fescue–Cold dark soils is an uncommon type, located outside the deep rainshadows. It is uncommon in old-alluvial parks within partial rainshadow climates in the Subalpine zone. This type also occurs throughout the western slopes of the Rocky Mountains, from southwestern Montana, western Wyoming, and central Idaho, to northwestern and central-western Colorado, perhaps also in northeastern Utah. *Silver sagebrush/fescue–Cold dark soils* is characterized by silver sagebrush (ARCA13), Thurber fescue (FETH), and yarrow (ACLA5). Many sites have Parry oatgrass (DAPA2) as well. See Table 32-7 for common species names and codes. Other distinguishing features include Subalpine locations in partial rainshadow, old-alluvial parks, and Cryoborolls or Cryaquolls.

Silver sagebrush/fescue–Cold dark soils is related to *Mountain sagebrush/Thurber-Arizona fescues–Deep cold clay soils*, which occurs at somewhat lower elevations on steeper, more southerly slopes, on slightly shallower, coarser soils, and has mountain sagebrush (ARTRV) instead of silver sagebrush. *Silver sagebrush/fescue–Cold dark soils* is also related to *Planeleaf willow/water sedge–Cold deep alluvial soils–Bottoms*, which occurs at somewhat higher elevations on coarser soils, which are more consistently Cryaquolls. Some of the soils sampled in *Silver sagebrush/fescue–Cold dark soils*, though, are Cryaquolls, and it occurs sometimes in alluvial bottoms, and shrubby cinquefoil seems a bit too common. The sites for *Silver sagebrush/fescue–Cold dark soils* are nowhere as watered at present as those of *Planeleaf willow/water sedge–Cold deep alluvial soils–Bottoms*. We feel that the sites of *Silver sagebrush/fescue–Cold dark soils* are former riparian areas, that have been uplifted in geological time frames.

The plant association *Artemisia cana/Festuca idahoensis* has been documented by Smith 1966, Schlatterer 1972, and Mueggler 1980. All the communities in the Gunnison Basin have *Festuca thurberi* in them; *Artemisia cana/Festuca idahoensis* phase *Festuca thurberi*, described as new here, is based on *Artemisia cana/Festuca thurberi* (Terwilliger 1978, Tiedeman 1978, and Hess 1981). *Artemisia cana/Festuca idahoensis* phase *Festuca thurberi-Danthonia parryi*, described as new here.

Once heavy grazing or other disturbance has removed grass reproduction (particularly Thurber and Idaho fescues), Kentucky bluegrass, dandelion, weeds, and forbs will increase and eventually dominate under silver sagebrush. There is probably a semi-permanent *disclimax* in which silver sagebrush and Kentucky bluegrass dominate, since the fescues will be slow to return if their seed source has been cut off. Spruce-fir forests border this type on adjacent uplands. Willow riparian or water sedge riparian communities adjoin on adjacent bottoms.

Horizontal obstruction is low to moderately low, so these sites provide little cover for deer and elk, but sometimes deer will bed here. Deer use is moderate for overnight stays spring through fall. These sites are too high and cold to be of use to sage grouse.

Summary of Ecological Type Characteristics

1. Explanation of symbols in Appendix A. Percentages in [brackets] indicate the percentage of plots sampled that have that characteristic.

NUMBER OF SAMPLES	10, soil descriptions from 6 of these (total 10)
ELEVATION	9,822 ft (8,900-10,390 ft) = 2,994 m (2,713-3,167 m)
AVERAGE ASPECT	4°M (r = 0.42)
LITHOLOGY	Mostly soft sedimentaries: mudstone and sandstone [67%]; some igneous: Tuff-gneiss-granite [33%]
FORMATIONS[1]	Various
LANDFORMS	Soil creep slopes [45%], mesas [18%], swales [18%]
SLOPE POSITIONS	Toeslopes and footslopes [83%]
SLOPE SHAPES	Concave [56%] to convex [22%] horizontally, Linear [67%] to concave [33%] vertically
SLOPE ANGLE	7.9% (4-15%)
SOIL PARENT MATERIAL	Various, mostly Slope Alluvium [78%] over something
COARSE FRAGMENTS	1.8% (0-5%) cover on surface, 18.9% (11-42%) by volume in soil
SOIL DEPTH	96 cm (44-154 cm) = 37.9 in (17-61 in)
MOLLIC THICKNESS	25 cm (20-30 cm) = 9.8 in (8-12 in)
TEXTURE	Surface is silty loam-silty clay loam [80%]; Subsurface is Clay-silty clay-sandy clay loam-clay loam
SOIL CLASSIFICATION	Argic Cryoborolls [75%] or Argic Cryaquolls [25%]; Deep to very deep
TOTAL LIVE COVER	198.4% (128.1-355.0%)
NUMBER OF SPECIES	26.8 (14-40)
TOTAL LIVE COVER/NO. SPECIES	8.4% (4.3-25.4%)
CLIMATE	Cool to cold, moist Subalpine climate, usually in partial rainshadow.
WATER	There is deep snow here most of the winter. Groundwater stays charged most of the season from adjacent aquifers and good ground cover.

Key to Community Types

1. Parry oatgrass >30% cover ..... A
1. Parry oatgrass usually absent, sometimes <15% cover ..... (2)

2. Thurber fescue dominant, >50% cover. Idaho fescue 0-10% cover ..... B
2. Thurber fescue <35% cover, rarely absent. Idaho fescue 0-70% cover C

Description of Community Types

A *Parry oatgrass-silver sagebrush-Kentucky bluegrass-desert sandwort* is dominated by Parry oatgrass, 30-75% cover. Silver sagebrush is subdominant, 20-40% cover. Thurber fescue is 5-15% cover. Other constants include ballhead desert sandwort (ERCO24) and yarrow (ACLA5). Total graminoid cover is 110-130%, and graminoid production is 2,200-2,700 lb/ac/yr.

B *Thurber fescue-silver sagebrush-shrubby cinquefoil* is dominated by Thurber fescue, 35-75% cover, with silver sagebrush subdominant, 15-35% cover. Total graminoid cover is 70-150%, and graminoid production is 1,500-3,000 lb/ac/yr.

C *Silver sagebrush-yarrow* is dominated by Idaho fescue, 0-70% cover, or Thurber fescue, 0-30% cover. Silver sagebrush is subdominant or codominant, 15-40% cover. Total graminoid cover is 60-130%, and graminoid production is 1,200-2,750 lb/ac/yr.

Table 32-4. Community types within *Silver sagebrush/fescue–Cold dark soils.*

Community Type	No. samples	Elevation, ft Slope, %	Coarseness, % Depth, cm Mollic Depth, cm	Surface Coarse, % Bare, % Seral Stage	Lr	Layer Height, m	Avg Layr Cvr %	Cover, %: Trees Shrubs Graminoids Forbs	No. Species Total Live Cover, % TLC/NS, %	Prod.[1], lb/ac/yr Shrubs Gramin. Forbs	Obstruct'n %: 1.5-2.0 m 1.0-1.5 m 0.5-1.0 m 0.0-0.5 m Total<2m
A. Parry oatgrass-silver sagebrush-Kentucky bluegrass-desert sandwort	2	9,990 4	13 85 20	1 (1-1) 7 (5-8) LM	S1 GF S2 M L	0.4 (0.2-0.7) 0.2 (0.0-0.9) Missing 0.0 0.0	20 93 M 1 1	0 (0-0) 29 (24-35) 120 (115-125) 114 (32-195)	21 (14-27) 263 (170-355) 15.8 (6.3-25.4)	583-864 2488-2662 196-1361	0 0 0 55 14
B. Thurber fescue-silver sagebrush-shrubby cinquefoil	4	10,098 (9,450-10,390) 7.1 (5-10)	22 (11-42) 117 (44-154) 25 (21-27)	2 (1-3) 20 (6-34) LS	S1 GF S2 M L	0.52 (0.1-0.9) 0.40 (0.0-1.2) 0.20 (0.0-0.4) 0.0 Missing	24.1 88.4 3.9 2.4 M	0 (0-0) 26 (17-34) 100 (77-148) 40 (21-66)	31 (26-40) 166 (128-248) 5.4 (4.3-6.2)	411-838 1626-2945 77-678	0 (0-0) 0 (0-0) 3 (0-5) 72 (55-90) 19 (14-24)
C. Silver sagebrush-yarrow	4	9,505 (8,900-10,140) 9.7 (5-15)	18 (17-18) 70 (66-74) 27 (24-30)	3 (1-5) 14 (1-25) EM-ES	S1 GF S2 M L	0.53 (0.1-1.0) 0.33 (0.0-1.0) 0.20 (0.0-0.4) 0.0 Missing	40.6 91.0 5.8 0.9 M	0 (0-0) 37 (31-45) 96 (62-127) 66 (23-102)	26 (20-30) 199 (140-268) 7.6 (5.9-9.9)	772-1082 1212-2690 94-1107	0 (0-0) 0 (0-0) 3 (0-5) 88 (85-90) 23 (21-24)

Table 32-5. Wildlife values (relative to the whole UGB) for the principal wildlife species using *Silver sagebrush/fescue–Cold dark soils*.		
CT	Mule Deer Season–Preference	Elk Season–Preference
All	Winter, Any– Very Low Spring/Fall– Moderate (Overnight)	Winter, Any– Very Low Spring/Fall– Mod. Low (Overnight)

Table 32-6. Resource Values for *Silver sagebrush/fescue–Cold dark soils*. Resource values were calculated from the numbers in Table 32-4, relative to the whole UGB.

The numbers in this table can be translated: 0 = Very Low, 1 = Low, 2 = Moderately Low, 3 = Moderate, 4 = Moderately High, 5 = High, and 6 = Very High.

	Community Type		
Resource Value	**A**	**B**	**C**
Potential Cattle Forage Production	5	4-5	4-5
Grazing Suitability	5	4	4
Wetland	No	No	No
Riparian Area	No	No	No
Developed Recreation	1-2	1-2	1-2
Dispersed Recreation	2-3	2-3	2-3
Scenic	3-4	3-4	3-4
Road & Trail Stability	2-3	2-3	2-3
Construction Suitability	1-2	1-2	1-2
Deer & Elk Hiding Cover	1	1-2	1-2
Deer & Elk Forage & Browse	3	3	3
Need for Watershed Protection	3	3	3
Soil Stability	2-3	2-3	2-3
Risk of Soil Loss-Natural	3	3	3
Risk of Soil Loss-Management	4	4	4
Risk of Permanent Depletion-Range	3-4	3-4	3-4
Risk of Permanent Depletion-Wildlife	1-2	1-2	1-2
Resource Cost of Management	4	4	4
Cost of Rehabilitation	3	3	3

Table 32-7. Common Species in *Silver sagebrush/fescue–Cold dark soils*, where Characteristic cover > 10% or Constancy > 20%. "–" means that the species is not found. Dead cover is not listed. Ccv = Characteristic Cover, Con = Constancy. If Avc = Average Cover, then these are related using the formula Avc = Ccv•100%/Con.

	Community Type	A		B		C		
		Ccv	(Con)	Ccv	(Con)	Ccv	(Con)	
Code	Species	N =	2		4		4	Common Name
	SHRUBS							
ARCA13	Artemisia cana	28	(100)	22	(100)	26	(100)	silver sagebrush
ARTRV	Artemisia tridentata ssp. vaseyana	1	(50)	–	–	30	(25)	mountain big sagebrush
PEFL15	Pentaphylloides floribunda	–	–	4	(100)	11	(25)	shrubby cinquefoil
	GRAMINOIDS							
ACLE9	Achnatherum lettermanii	–	–	1	(25)	14	(50)	Letterman needlegrass
ACNE9	Achnatherum nelsonii	5	(50)	5	(75)	–	–	Nelson's needlegrass
ACPI2	Achnatherum pinetorum	12	(50)	7	(50)	1	(25)	pine needlegrass
BRCA10	Bromopsis canadensis	5	(50)	1	(50)	2	(25)	fringed brome
CAGE2	Carex geyeri	–	–	1	(25)	2	(25)	elk sedge
CAOB4	Carex obtusata	9	(50)	19	(25)	28	(25)	blunt sedge
DAIN	Danthonia intermedia	–	–	14	(50)	–	–	timber oatgrass
DAPA2	Danthonia parryi	52	(100)	–	–	15	(25)	Parry oatgrass
ELEL5	Elymus elymoides	1	(50)	1	(25)	1	(50)	bottlebrush squirreltail
ELTR7	Elymus trachycaulus	–	–	2	(25)	1	(75)	slender wheatgrass
FEAR2	Festuca arizonica	–	–	–	–	10	(25)	Arizona fescue
FEID	Festuca idahoensis	–	–	2	(75)	52	(75)	Idaho fescue
FETH	Festuca thurberi	8	(100)	55	(100)	12	(75)	Thurber fescue
KOMA	Koeleria macrantha	11	(50)	6	(75)	5	(50)	prairie junegrass
PASM	Pascopyrum smithii	–	–	1	(25)	T	(25)	western wheatgrass
POFE	Poa fendleriana	–	–	5	(50)	45	(25)	muttongrass
PONEI2	Poa nemoralis ssp. interior	–	–	5	(50)	5	(50)	interior bluegrass
POPA2	Poa palustris	–	–	–	–	15	(25)	swamp bluegrass
POPR	Poa pratensis	38	(100)	25	(25)	6	(50)	Kentucky bluegrass
	FORBS							
ACLA5	Achillea lanulosa	15	(100)	6	(100)	8	(100)	western yarrow
ADLE	Adenolinum lewisii	–	–	2	(75)	T	(25)	blue flax
AGGL	Agoseris glauca	–	–	–	–	39	(25)	false-dandelion
ANSE4	Androsace septentrionalis	–	–	T	(25)	T	(25)	northern rock-jasmine
ANPA	Anemone parviflora	–	–	3	(25)	1	(50)	arctic anemone
ANRO2	Antennaria rosea	–	–	1	(25)	4	(25)	rose pussytoes
CEFO2	Cerastium fontanum	–	–	1	(25)	2	(25)	mouse-ear
ERCO24	Eremogone congesta	26	(100)	5	(75)	1	(25)	desert sandwort
ERSP4	Erigeron speciosus	–	–	–	–	22	(25)	Oregon fleabane
ERSU2	Erigeron subtrinervis	2	(50)	6	(100)	1	(25)	threenerve fleabane
ERSU11	Eriogonum subalpinum	–	–	T	(25)	1	(25)	sulfurflower
ERTR19	Erythrocoma triflora	–	–	2	(75)	8	(50)	prairie smoke
FRVI	Fragaria virginiana	20	(50)	–	–	–	–	Virginia strawberry
GASE6	Galium septentrionale	–	–	5	(25)	1	(25)	northern bedstraw
HEPA11	Heuchera parvifolia	–	–	T	(25)	T	(25)	littleleaf alumroot
LALE2	Lathyrus leucanthus	2	(50)	13	(25)	–	–	aspen peavine
MIOR2	Micranthes oregana	–	–	T	(25)	1	(25)	Oregon saxifrage
ORLU2	Orthocarpus luteus	9	(100)	T	(25)	–	–	yellow owl-clover
PATR7	Packera tridenticulata	–	–	1	(25)	2	(25)	groundsel
PODO4	Polygonum douglasii	1	(50)	1	(75)	3	(50)	Douglas knotweed
POHI6	Potentilla hippiana	3	(50)	6	(25)	T	(25)	horse cinquefoil
POPU9	Potentilla pulcherrima	40	(50)	6	(100)	6	(100)	beauty cinquefoil
SENEC	Senecio	–	–	1	(25)	1	(25)	groundsel
TAOF	Taraxacum officinale	30	(50)	2	(25)	9	(75)	common dandelion
TRGY	Trifolium gymnocarpum	–	–	4	(50)	54	(25)	holly-leaf clover
TRRE3	Trifolium repens	20	(50)	7	(50)	–	–	white Dutch clover
	GROUND COVER							
.BARESO	bare soil	7	(100)	20	(100)	14	(100)	
.LITTER	litter and duff	90	(50)	78	(100)	84	(100)	
GRAVEL	gravel 0.2-10 cm	1		1		2		
.COBBLE	cobble 10-25 cm	–	–	1	(25)	–	–	
.STONES	stone > 25 cm	–	–	–	–	–	–	
.MOSSON	moss on soil	1	(50)	7	(25)	3	(25)	
LICHENS	lichens on soil	1		2		2		